

*Patent Application Serial No. 08/897,953  
Response to Office Action of January 28, 2008*

**REMARKS**

The amendments to claim 15 are supported as follows: "transcribing a conductive adhesive on the projection electrodes" is supported by canceled claim 6; "under the substrate" is supported by heat plate 39 in Fig. 4D; "so as to connect the projection electrodes and mounting pads on the substrate through conductive adhesive" is supported by Fig. 4E; and "when the thermosetting insulating adhesive is cured by the heating means" is supported by the specification at page 9, lines 17-18.

The features of new claim 19 are supported at: page 8, lines 14-15 ("transcribing a conductive adhesive on projection electrodes of the semiconductor chip"); page 8, line 29 to page 9, line 9 ("applying a thermosetting insulating adhesive on the substrate so to fix the semiconductor chip" and "heating the thermosetting insulating adhesive by a first heating means in a stage under the substrate"); page 9, lines 12-18 ("aligning the semiconductor chips to the substrate so as to connect the projection electrodes and mounting pads on the substrate through the conductive adhesive" and "pressing the semiconductor chip to the substrate when the thermosetting insulating adhesive is cured by the first heating means"); and page 9, lines 19-35 ("pressing the semiconductor chip to the substrate and heating the semiconductor chip by a second heating means above the semiconductor chip").

The amendment to claim 16 is supported in Fig. 4D.

Claims 3, 5, 6, 8 and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over applicants' admitted prior art (AAPA), Maeda, and Koga, all previously applied. This rejection is respectfully traversed and the Examiner is requested to consider the following arguments:

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**Half Cure/Full Cure.** The Applicants use two different adhesives of opposite properties, namely, insulating and conductive. One them, the Applicants' insulating adhesive (e.g., 38 in Fig. 4C) is thermoset (cured) in two distinct stages. After being spread onto the areas that the chips will occupy, the adhesive is half-cured (step (c) in claim 15; Fig. 4D; page 8, line 37; page 9, lines 7-9). Then, the chip is aligned and pressed into contact with the substrate mounting pads, with the conductive adhesive 36a ensuring electrical continuity (claim 15, step (e)). Finally, the insulating adhesive is fully cured ("heating ... with a thermosetting temperature" in line 2 of step (g) in claim 15).

**Maeda's Area.** The Examiner relies on Maeda for disclosing the first curing stage, which is lacking from the other references. However, Maeda's curing is not what is claimed, because it is restricted to an area that is not the same as the Applicants'. The Examiner is invited to consider the second full paragraph on page 7 of the English translation:

"Next, leadless electrical parts 5 are mounted on the adhesive 3 (FIG. 2(c)). At this time, a little adhesive 3 is pressed out of both sides of the electrical parts 5 (not shown). ... ultraviolet rays are applied .... By the above radiating process, the *pressed-out part* of the adhesive 3 is hardened. Subsequently, a second heating process is carried out .. to perfectly harden the adhesive *surrounding* the electrical parts 5" (emphasis added).

Thus, no curing of adhesive between the leadless electrical part 5 and the circuit pattern 2 is disclosed in this reference.

**Thermosetting Adhesive.** Maeda discloses thermosetting adhesive (page 5, line 5), but teaches against it for the reason that thermosetting adhesives such as epoxy are "difficult to manage" and "adhesion may be degraded" (page 5, lines 12-17). Even if Maeda were to use thermosetting adhesive, however, there would still be no disclosure of thermo-curing the

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thermosetting adhesive between the leadless electrical part 5 and the circuit pattern 2, because only the pressed-out part is cured.

Therefore, there is no suggestion to apply heat on the *underside* of the circuit pattern 2, as the Applicants recite in claim 15, which reads “(c) heating ... so as to harden the thermosetting insulating adhesive to a half-thermosetting state by *heating means under the substrate*” (emphasis added). A heating means under the substrate would be contrary to the teaching of Maeda.

**Soldering.** The Examiner is also invited to note that in Fig. 1 of Maeda, the final step is labeled, “To A Soldering Process,” probably referring to soldering of the contacts of the leadless electrical part onto the circuit pattern 2; at any rate, there is no disclosure of conductive adhesive in this embodiment. Maeda does use conductive adhesive in the second embodiment (Fig. 5; page 9, middle paragraph). Because Maeda uses conductive adhesive for chip leads of Fig. 5 but not with the un-leaded chip of Fig. 2, it inherently teaches against the use of conductive adhesive when there are no extending leads.

**Pressure.** In Maeda, there is no disclosure of the Applicants’ pressure when curing the adhesive, which is a feature of both claims 15 and 19.

**No Expectation of Success.** Furthermore, the person of ordinary skill would not have combined AAPA with Maeda because Fig. 1E of the AAPA shows only minimal extension of the adhesive 18 beyond the chip 11. Knowing that Maeda relies on curing only adhesive extruded from the edge, that person would have realized that AAPA is ill-suited to Maeda’s disclosed disposition of adhesive, which would have provided only a very weak reinforcement.

In sum, Maeda does not disclose or suggest the Applicants’ claims, and the other

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references do not make up for the deficiencies of Maeda. Koga discloses no configuration to heat an anisotropic conductive film on a temporary fixing stage 10, and thus, Koga fails to disclose the Applicants' step (e). Koga also teaches an anisotropic conductive film to carry out bonding, which is completely different from the Applicants' adhesive.

**New Claim 19 and Dependent Claims.** Claim 19, like claim 15, recites heating the thermosetting insulating adhesive by a first heating means in a stage under the substrate, and therefore is patentable, *inter alia*, by the arguments above for claim 15. The dependent claims under consideration depend from claim 15 and are patentable at least for the reasons above.

Allowance is requested.

Respectfully submitted,

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